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REPORT

of

The Infantry Board

[redacted]

No. 1407

ROCKET, AT, 2.37", M6, ROCKET, PRACTICE, AT, 2.36", M6,
AND LAUNCHER, ROCKET, AT, M1.

FORT BENNING, GEORGIA

October 15, 1942.

24725—Benning, Ga., 9-16-42—2,000

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IB-471.6

October 15, 1942.

Subject: Report of Test of:
Rocket, AT, 2.36", M6,
Rocket, Practice, AT, 2.36", M7,
Launcher, Rocket, AT, M1.

To: Chief of Requirements Section,
Army Ground Forces, Army War College,
Washington, D. C.

1. The Infantry Board concurs in general in the Discussion and Conclusions contained in Sections VI and VII of the inclosed Report of Test.

2. It is the opinion of the Infantry Board that the subject Rocket Launcher is a very powerful offensive as well as defensive weapon. Refinements in ballistic characteristics of the present rocket and the development of an anti-personnel rocket should increase the subject weapon's dual purpose value. The Infantry Board believes that, from a tactical standpoint, Rocket Platoons in Battalion and Regimental Headquarters Companies as suggested in Appendix "G", "H" and "I" of the Report of Test would be the most advantageous and flexible system of distributing the subject weapons. However, such a system would require either the abandonment of certain present weapons or the addition of personnel and vehicles - neither of which actions appears to be warranted at the present time. The Infantry Board believes that the only immediately applicable system of distribution is to superimpose the subject weapons on others. This has one decided disadvantage in that vehicles which are already overloaded will be even further overloaded. Because of this disadvantage, the Infantry Board considers the distribution outlined in paragraph 3 below an expedient only, but one which should be tentatively adopted in order to place this valuable weapon in the hands of Infantry troops without delay.

3. Tentative Distribution of Rocket Launchers (Infantry Regiment):

3 per Rifle Company
1 per 60mm Mortar Squad (See Note a)

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6 per Heavy Weapons Company
1 per 81mm Mortar Squad (See Note b)

8 per Battalion Headquarters Company
1 per 37mm Gun Squad (See Note c)
2 per Ammunition and Pioneer Platoon (See Note d)
2 per Battalion Headquarters Section (See Note e)

24 per Antitank Company
4 per Antitank Mine Squad (See Note f)
1 per 37mm Gun Squad (See Note g)

2 per Regimental Headquarters Company
1 per Reconnaissance Squad of Intelligence Platoon (See Note h)

19 per Service Company
4 per Staff Section, Regimental Headquarters Platoon (See Note i)
1 per 2 2½-ton Cargo Trucks (See Note j)

8 per Cannon Company
1 per 75mm howitzer; 1 per 105mm howitzer (See Note k)

Total Regiment - 122

Note a. To supplement the mortar fire. To be manned by ammunition bearers and available privates basic. Normally carried on 1/4-ton truck w/trailer assigned to 60mm Mortar Section.

Note b. To supplement the mortar fire. To be manned by ammunition bearers. Normally carried on 1/4-ton trucks w/trailers assigned to 81mm Mortar Platoon.

Note c. To supplement the 37mm gun fire. To be manned by chauffeurs. Normally carried on 1/4-ton trucks assigned to each 37mm squad.

Note d. To supplement the pioneer equipment. To be manned by ammunition bearers. Normally carried on 1/4-ton trucks assigned to Ammunition and Pioneer Platoon.

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Note e. For protection of the Battalion command post. To be manned by personnel of Battalion Headquarters Section. Normally carried on 1/4-ton trucks assigned to Battalion Headquarters.

Note f. To cover mine field gaps or for stalking tanks. To be manned by members of the Antitank Mine Squads. Normally carried on 2½-ton trucks assigned to Antitank Mine Platoon.

Note g. To supplement the 37mm gun fire. To be manned by ammunition bearers. Normally carried on 1/4-ton trucks assigned each 37mm Squad.

Note h. For use against targets of opportunity. To be manned by personnel of Reconnaissance Squads. Normally carried on 1/4-ton trucks, amphibian.

Note i. For protection of the Regimental command post. To be manned by clerks and orderlies. Normally carried on transportation assigned to forward echelon of Regimental command post.

Note j. For protection of truck park. To be manned by chauffeurs. Normally carried 1 per 2 2½-ton trucks of Transportation Platoon, Service Company.

Note k. For close in protection of primary weapon. To be manned by vehicular crews. Normally carried in self propelled mounts.

4. The Infantry Board recommends:

a. That the Rocket Launcher be considered an offensive as well as a defensive weapon.

b. That the Tentative Distribution of Rocket Launchers outlined in paragraph 3, above, be adopted.

c. That the Rocket Launcher not replace the rifle launcher in any unit of the Infantry Regiment.

d. That the Rocket Launcher be considered unsafe for firing from inclosed places such as pill boxes but safe for firing from open emplacements, and rooms with open windows.

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g. That the Rocket Launcher and Rocket should be improved as indicated in paragraph 70, Report of Test.

f. That the basis of issue of service ammunition be:

(1) 11 per launcher carried on vehicle with launcher.

(2) 10 per launcher carried in transportation of the Antitank Mine Platoon - constituting the regimental re-supply.

g. That the training allowance of practice ammunition be 10 per individual.

h. That an inert rocket for training in loading be developed and issued on the basis of 2 per launcher.

i. That the following accessories be issued with each launcher:

1 Sling, Carbine
1 Bag, ammunition, M-1.

j. That a training circular be prepared based on Appendix "J", Report of Test.

For the President:

M. J. GUNNER,
Colonel, Infantry,
Director.

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REPORT of TEST

REPORT OF TEST OF:
ROCKET, AT, 2.37", M6
ROCKET, PRACTICE, AT, 2.36", M7
LAUNCHER, ROCKET, AT, M1

TEST SECTION
THE INFANTRY BOARD
FORT BENNING, GEORGIA

CONFIDENTIAL

Submitted to
THE INFANTRY BOARD

Copy No._____ **Date** October 12, 1942.

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TEST SECTION
THE INFANTRY BOARD
FORT BENNING, GEORGIA

OCTOBER 12, 1942

SUBJECT: REPORT OF TEST OF: ROCKET, AT, 2.36", M6
ROCKET, PRACTICE, AT, 2.36", M7
LAUNCHER, ROCKET, AT, M1

TO: THE PRESIDENT, THE INFANTRY BOARD, FORT BENNING, GEORGIA.

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I AUTHORITY AND REFERENCES

1. a. Letter, Headquarters, Army Ground Forces, 471.6/25(C)-GNRQT/14205, August 23, 1942, Appendix "A".

b. Teletype, Requirements Division, August 29, 1942, Appendix "B".

c. Letter, Adjutant General to Commanding General, S.O.S., 413.77/70-GNRQT/15559, Sept. 12, 1942, Appendix "D".

d. Letter, Inf. Br., Req. Section, A.G.F., Sept. 9, 1942, Appendix "E".

2. a. Ordnance Field Service Technical Bulletin (OFSTB) 200-6, July 4, 1942.

b. Ordnance Committee Meeting Items number:

(1) 17513, December 12, 1942.

(2) 17589, January 2, 1942.

(3) 18246, May 20, 1942.

(4) 18376, June 20, 1942.

(5) 18421, June 20, 1942.

(6) 18460, July 9, 1942.

(7) 18594, July 29, 1942.

(8) 18565, July 30, 1942.

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II PURPOSE OF TEST

3. To determine:

a. If the rocket launcher should replace the rifle launcher in certain units of the Infantry Regiment.

b. If the rocket launcher should be included in any unit of the Infantry Regiment in addition to the present allowance of rifle launchers.

c. If the rocket launcher is capable of being fired safely from trenches, emplacements and other closed places.

d. The basis of issue, if any, of the rocket launcher and rocket.

e. Data on the characteristics, design and method of operation of the rocket launcher and rockets, including methods of carrying and crew necessary to operate.

f. Data necessary for inclusion in instructional material.

g. What, if any, accessories or auxiliary equipment may be needed for operation of this materiel.

III PERSONNEL

4. a. Captain Edward B. Crossman, Infantry, Test Section, The Infantry Board, conducted the tests and prepared this report.

b. He was assisted by:

(1) 1st Lt. William G. Lundy and enlisted men of the 124th Infantry.

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(2) 1st Lt. Cleveland P. Millirons, Jr., and enlisted men of the 29th Infantry.

(3) 1st Lt. Henry W. Turney and enlisted men of the 151st Infantry.

IV INTRODUCTORY INFORMATION AND DESCRIPTION OF PROJECT TESTED

5. The references listed in paragraph 2 a record the recommendations of the Ordnance Committee and approvals to those recommendations for adoption of antitank grenades to be discharged from the cal. .50 machine gun, the adoption of rockets and launchers for limited procurement, the adoption of rockets and launchers as standard and the classification of cal. .50 grenades as obsolete.

6. a. The Launcher, Rocket, AT, M1, is a device for discharging antitank projectiles from the shoulder. It is recoilless, since the projectiles are based on the rocket principle. The launcher consists of the following: (See Plates 1 and 2.)

(1) A straight tube, open on both ends, about 2.36" in diameter.

(2) Two hand grips, the rear one containing the firing switch.

(3) A shoulder stock, containing the firing battery, one spare and a light bulb for checking the circuit.

(4) A front sight, with four studs for various ranges (See Plate 3).

(5) A rear sight, which is hinged.

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(6) A contactor mechanism on top of the barrel.

(7) A latch for holding the grenade and making contact with the grenade tail.

(8) A guard for the rear of the barrel.

b. The Rocket, AT, 2.36", M6, is a high explosive, antitank grenade (See Plate 4). The grenade is composed of:

(1) The high explosive head.

(2) The tail, containing the propellent charge and igniter.

(3) The fins.

(4) The safety pin, to which is fastened a string, leading to the waterproofing plug in the tail.

(5) The front contact, which is brass, insulated ring. Fastened to this is

(6) A wire leading to the igniter and finally grounded on notches in the fins.

c. The Rocket, Practice, AT, 2.36", M7, is generally similar to the M6 rocket, except that it has no high explosive charge, is painted black and has a balancing rod extending from the tail through the head.

d. The grenade is fired by inserting it in the rear end of the launcher, removing the safety pin and the waterproofing plug, raising the contactor handle to "Fire" and pressing the trigger to complete the electric circuit. The barrel lies on the shoulder, and the stock rests against the shoulder for positioning only. There is no recoil.

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V DETAILS OF TESTS AND RESULTS

7. Test No. 1.

a. Purpose: To determine physical characteristics of the launcher and rockets.

b. Measurement and weighing.

c. Results:

(1) The Launcher:

Length, maximum overall	54.69"
Length of tube	54"
Weight	14.20#
Internal diameter of tube	2.39"
External diameter of tube	2.51"
Maximum external dimension (top of contactor to bottom of stock)	9½"
Battery: 2 cell "Eveready #791A", 3 volt	-
Weight of face guard	0.51#

(2) Rocket, AT, 2.36" M6 and Practice M7

Weight, as loaded into launcher:	3.45#
Weight, including container	4.75#
Length of rocket	21.5"
Maximum diameter of rocket (less wire & braid)	2.32"
Weight of propellent	0.125#

(3) Ammunition containers and packing box: (See Plate 5)

(a) Container:

Maximum diameter	3.35"
Maximum length	22.5"
Weight, empty	1.3#

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(b) Packing box:

Size: 1'4" by 1' 9½" by 2' 1/2" deep
Weight, empty 36#
Weight, complete with 20 rockets 131#

8. Test No. 2.

a. Purpose: To determine time of flight of the rocket.

b. Method: Rockets fired at various ranges were timed by several observers using stop watches.

c. Results:

(1) 100 yards: average time of flight 1.3 seconds.
(2) 200 yards: 2.8 seconds.
(3) 300 yards: 3.9 seconds.
(4) 400 yards: 5.5 seconds.
(5) 20 degrees (500 yards) 6.7 seconds.
(6) 30 degrees (543 yards) 8.5 seconds.

9. Test No. 3.

a. Purpose: To determine leads necessary on moving targets.

b. Method: From the times of flight, leads necessary to hit a vehicle crossing at ninety degrees to the line of fire were calculated.

c. Results:

Range	Lead, feet 10 m/h	20 m/h	Lead, tank lengths (based on average tank 18 feet in length) 10 m/h	20 m/h
100	19	38	1	2
200	42	84	2	5
300	58	115	3	6
400	81	162	4	9

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10. Test No. 4.

a. Purpose: To determine accuracy of the rocket.

b. Method: By firing from a rest and observing the point of strike and the dispersion.

c. Results:

(1) 100 yards: Three shot group approximately 34" vertical; 14-1/2" horizontal.

(2) 200 yards: Lateral dispersion approximately 12 feet.

(3) 300 yards: Lateral dispersion approximately 26 feet. Longitudinal dispersion approximately 26 yards.

(4) 400 yards: Lateral dispersion approximately 5 feet (3 shots only). Longitudinal dispersion approximately 33 yards.

(5) The groups above are based on 3 or 4 shots only fired at each range. It is probable that more firing would enlarge the groups somewhat.

(6) At ranges of 200 yards and over it was found impossible to keep groups on a 6x6' target.

11. Test No. 5.

a. Purpose: To determine if the studs on the front sight are correctly located. (See Plate 3.)

b. Method:

(1) By observation of firing.

(2) By setting a launcher up in a rest, aiming carefully with various range studs on the front sight and measuring the angles on the launcher.

c. Results:

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(1) The graduations on the sights are not too accurate. It was found necessary to hold off at various ranges. Generally the launchers shoot to the right and it was frequently found that the 200 yard stud gave high shots. Results were not entirely uniform, as all of the front sights were not exactly alike.

(2)

Range	Angle of departure	Difference
100 yd.	43 ₥	
		75 ₥
200	118	
		71
300	189	
		84
400	273	

(3) Measuring the vertical distances between studs showed that the distance from the 100 to the 200 yard stud was greater than the distance from the 200 to the 300 yard stud, indicating that one (or more) of the studs is not correctly located.

12. Test No. 6.

a. Purpose: To determine accuracy of sighting under ideal conditions.

b. Method: A launcher was set in a rest and 12 men made sighting triangles in the conventional manner. Range 100 yards.

c. Results:

See Appendix F for details.

The greatest distance between two points of any of the triangles was 2.6".

13. Test No. 7.

a. Purpose: To determine range of the rocket at high angles.

b. Method: By firing three shots each at angles of 20 and 30 degrees.

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c. Results:

(1) Twenty degree angle of departure (356 ㍄)

Range: 475, 511, 513, average 500 yards.

(2) Thirty degree angle of departure (534 ㍄)

Range: 510, 520, 600, average 543 yards.

14. Test No. 8.

a. Purpose: To determine at what angle the rocket will slide from the launcher.

b. Method: Several rockets were put in several launchers, the launchers tipped muzzle up and muzzle down and shaken.

c. Results:

(1) With the muzzle up and the barrel vertical, the rocket will not slide from the launcher if the launcher is held still. If the launcher is shaken, the rocket may slip from the grasp of the tail latch and fall out of the launcher.

(2) With the muzzle down and the barrel vertical, the rocket will not slide from the launcher if the launcher is held still.

(a) With the contact up, that is, in the "safe" position, moderate shaking may cause the rocket to slip from the grasp of the tail latch and fall through the bore of the launcher.

(b) With the contact down, that is, in the "fire" position, the rocket will not slide through the barrel, even with severe shaking.

15. Test No. 9.

a. Purpose: To determine what would happen if the launcher were dented and grenades then fired through it.

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b. Method: The muzzle of the launcher was deliberately battered, as shown in Plate 6. A practice grenade was fired. The muzzle was again dented, more than shown in Plate 6, and a large dent, about 2" long by 1" wide and about 3/8" deep, was hammered in the side of the tube about 15 inches ahead of the rocket position. An HE grenade was fired through the launcher.

c. Results:

(1) The practice grenade partially straightened out the dents. The ogive of the recovered grenade had deep scars on it from the dents. No other effects were noticed.

(2) The HE grenade partially straightened out the dent in the side of the barrel and the dents in the muzzle. The ogive of the recovered grenade had deep scars on it. No other effects were noticed. The grenade did not detonate in the launcher and did not detonate on striking the ground.

(3) It is highly improbable that normal service will produce deep dents in the launcher tube. It required severe blows to produce the dents in this test.

16. Test No. 10.
September 16, 1942.

a. Purpose: To determine if the rocket and the rocket launcher are affected by water.

b. Method: 6 rockets in sealed containers, 6 rockets removed from the containers and 6 launchers were put under a spray of water for 4 hours. At the end of that time, an examination was made of the rockets and launchers and an attempt was made to fire them.

c. Results:

(1) Rockets in containers.

(a) The six containers were placed in various positions:

Two containers horizontal
One container vertical, nose of rocket up
One container vertical, nose of rocket down

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One container inclined 30 degrees from the horizontal, nose of rocket down
One container inclined 10 degrees from the horizontal, nose up.

(b) When the containers were opened and examined, there was no sign of water or dampness on the inside surfaces of the tubes. No signs of dampness were observed on the rockets. These containers apparently are fairly water-resistant. Three of the six rockets from the sealed tubes were fired, and functioned normally.

(2) Rockets out of containers.

(a) The six rockets were placed in various positions so the water could play directly on them. The positions were:

One rocket vertical, with the nose submerged in the lid of a container filled with sand and water. The tail of the rocket was up.
One rocket vertical with the nose up.
One rocket inclined at an angle of 10 degrees with the horizontal, nose down.
One rocket inclined at an angle of 30 degrees with the horizontal, nose up.
Two rockets horizontal, lying flat on the surface of the ground.

(b) At the conclusion of the four-hour wetting, water was noted in the safety pin hole, and the braid insulation was soggy. An attempt was made to fire all six rockets. Of these, one failed to fire after repeated trials. This rocket was standing nose down, tail up during the wetting process.

All other rockets fired normally. The attempt to fire was made within 45 minutes of removing rockets from the spray.

(3) Rocket launchers.

(a) The six launchers were placed in various positions, as follows:

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Three launchers horizontal, with the stock on the side.
One launcher horizontal, with the stock up and cover over the batteries open, exposing the batteries directly to the water.
One launcher horizontal, with the stock to the side, and the cover over the batteries open.
Two launchers inclined at an angle of 30 degrees from the horizontal.

(b) At the conclusion of the four hour soaking, all launchers were thoroughly wet, slight rust was showing inside the tube and the batteries and stock were generally soaked. The bulb on the side of the stock lighted normally in each case when the trigger was pressed. One round was fired from each launcher. The launchers all functioned normally. The firing was done within 30 minutes after removing the launchers from the water.

17. Test No. 11.

a. Purpose: In the previous test, Test No. 10, it was noted that one rocket failed to fire after wetting. Inasmuch as a certain per cent of dry rockets fail to fire, the present test was for the purpose of determining whether the misfire was due to wetting or due to another malfunction of the rocket.

b. Method: Five rockets, M6, were put under a spray of water. The rockets were set vertically, nose down, so the tail plug got the full effect of the wetting. The rockets were kept under a spray for three hours and forty-five minutes, removed and stored in a dry place for 15 hours. They were again put under the spray for 1 hour and thirty minutes, and an attempt was made to fire them.

c. Results:

(1) Three of the rockets gave very long hang-fires. Smoke came out of the tail of the rocket during the hang-fire, and noises could be heard in the rocket. All three eventually fired.

(2) One rocket behaved normally.

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(3) One rocket failed to fire. When the waterproofing plug was pulled out of the nozzle, water ran out of the combustion chamber, indicating that the waterproofing had not been satisfactory.

18. Test No. 12.

a. Purpose: To determine what would happen if the waterproofing plug in the nozzle were not removed before the rocket was fired.

b. Method: The string fastened to the plug was cut off and no attempt was made to remove the plug. Three rockets were fired.

c. Results:

(1) In all three cases, the plug was blown out of the tail of the rocket before the rocket had moved far. It sounded as if the plug were blown out on the ignition of the priming charge and before the propellant had started the rocket moving.

(2) No harmful effects were noted on rocket or gun.

19. Test No. 13.

a. Purpose: To determine the penetration of the M6 rocket on armor plate.

b. Method: A 2" piece of armor plate and a 1" piece of armor plate were placed together, making a total thickness of three inches. Rockets were fired at the plates.

c. Results: See Plates 7, 8, 9.

(1) Complete penetration of the 3" thickness was obtained in every case. The hole through the back of the rear (1") plate was about 0.31" in diameter.

(2) A wooden screen 66" behind the rear plate in one instance had a metal fragment about 3/8" in diameter and 1" long stuck in the panel. The wood was charred around the fragment. A large number (50-100) of small fragments dented the panel or were stuck in the panel, over an area of about 2' in diameter.

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20. Test No. 14.

a. Purpose: To determine the penetration of the M6 rocket.

b. Method: A one-inch piece of armor plate was placed 5" in front of a two inch piece of armor plate and rockets were fired at the plates.

c. Results: See Plates 10, 11, 12, 13.

(1) The entrance hole in the 1" plate was about 0.75" in diameter.

(2) The exit hole in the 1" plate was about 1" in diameter.

(3) The exit hole in the back of the 2" plate was about 0.25" in diameter.

21. Test No. 15.

a. Purpose: To determine fragmentation of the M6 grenade.

b. Method: Fragmentation screens 6' high and made of 1" pine were set up around a steel plate. Grenades were fired at the plate and fragments noted on the screens.

c. Results:

See Plate for details.

(1) It will be noted that there is a safe angle of about 16 degrees in rear of the point of impact at a five yard radius.

(2) It will be noted that there is a safe angle of about 46 degrees in rear of the point of impact at a 10 yard radius.

(3) Generally, the larger fragments are thrown out to the sides, with fewer and fewer large fragments appearing as the line of fire is approached.

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(4) At the 5 yard distance many of the fragments were small, had little velocity and would give relatively minor injuries.

(5) It should be noted that the safety angles mentioned above, are actually cones, with the point of impact as the point of the cone. Consequently, fragments are thrown up in the air and occasionally fragments will strike personnel at some distance from the target. These fragments normally have little weight and little velocity and will probably not penetrate the skin. During the firing of nearly 1000 rounds of HE in this test, no individual had skin broken by fragments. However, on one occasion a large piece of the tail was thrown over 400 yards. The tail is easily observed and avoided.

22. Test No. 16.

a. Purpose: To determine if the rocket alone could be fired as a booby trap without the launcher.

b. Method: The metal bottom and wooden spacer were knocked out of a rocket container tube. The container was used to hold and direct the rocket.

(1) A wire was fastened to the insulated brass ring on the nose of the rocket and another wire to the tail. The far ends of the wires were touched to a battery.

(2) A blank cartridge was made up, containing EC Blank Fire powder. The primer was ignited by means of a pull-type Engineer ignition device.

(3) The standard blank cartridge M3, used in discharging the M9A1 grenade, was inserted in the tail and ignited by means of a pull-type Engineer ignition device.

(4) Bullets were pulled from standard M2 ball cartridges, the case mouth crimped and fired as above.

c. Results: See Plate 14.

(1) The grenade was discharged satisfactorily. Standard W-130 wire was used, 87' long and the rocket fired by use of a 4-1/2 volt battery.

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(2) The grenade was discharged satisfactorily.

(3) The grenade was discharged satisfactorily.

(4) The grenade could not be discharged. The powder in the cartridge did not ignite sufficiently to ignite the propellant in the rocket.

(5) Several attempts were made in the cases mentioned above and the results were consistent.

(6) By using a little care in aligning the tube, the rocket can be directed fairly accurately. Range may be set with a clinometer. Effective up to 200 yards (Estimated).

23. Test No. 17.

a. Purpose: To determine whether the discharge of the launcher is very noticeable from the front and flanks.

b. Method: Rockets were fired while observers were at varying locations in front of the launcher.

c. Results: See Plates 15, 16, 17, 18, 19.

(1) The noise of the discharge is not very loud, but is a dull report. At ranges of 400 yards the report was not at all prominent and probably would not be particularly noticeable if other weapons were being fired in that general vicinity. It was the opinion of the observers that the noise of a rifle discharge was more noticeable at 1000 yards than the report of the launcher at 400 yards.

(2) At 50 yards to one flank of the projectile's line of flight, and at a range of 400 yards, the red flash from the breech of the launcher could be seen in daylight.

(3) At night the flash from the breech was very noticeable.

(4) Because of the terrific blast at the rear of the launcher, and because the rear end of the launcher is usually directed down towards the ground and is generally close to the ground, the blast usually stirs up a large amount of

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dust. This is particularly true when soil in rear of the launcher is soft, dusty, or sandy. Where the dirt is held down by weeds, grass, etc., the dust cloud is not so noticeable.

24. Test No. 18.

a. Purpose: To determine if there is any danger of setting fire to material in rear of the launcher.

b. Method: Dry, torn and crumpled paper was put about 3 feet behind the launcher and a rocket was fired. The launcher was fired in brush and dry grass.

c. Results:

(1) The paper was torn and blown over a considerable area, but was not set on fire and no scorching was noted.

(2) No occasion was noted when grass or brush was set on fire by the discharge from the rear of the launcher.

25. Test No. 19.

a. Purpose: To determine a method of assignment of launchers in the Infantry Regiment.

b. Method: Study.

c. Results: See Appendix A, H, I.

(1) Before starting the training of any men, a conference was held in which the Chief of the Test Section of The Infantry Board, the Chief of the Weapons Group of The Infantry School and a representative of the Tactical Group of The Infantry School were present. After considering the individual and organization weapons and loads in the Infantry Regiment the conference concluded:

(a) That all loads were too heavy for the transportation provided.

(b) That no weapons should be replaced.

(c) That the subject weapon was offensive as well as defensive.

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(d) That only by adding men and transportation could the subject weapons be used to advantage.

(e) That the number of launchers should not be less than 24 per battalion and 24 per regiment.

(f) That separate organizations should be created to accomplish this as follows:

One platoon in each Battalion Headquarters Company.

One platoon in Regimental Headquarters Company. See Appendix "G".

(2) The organization having been decided upon, the platoons were organized and trained.

(3) Each platoon was composed of: 1 Lieutenant, Platoon Leader; 1 Staff Sergeant, Platoon Sergeant; 2 chauffeurs and four squads, or a total of 56.

(4) Each squad was composed of 1 Sergeant, Squad Leader, and 6 rocket teams, a total of 13 men per squad. See Appendix H.

(5) Each rocket team was composed of one private, gunner and one private, loader, or a total of two men. See Appendix H.

(6) Two 1/4-ton trucks with 1/4-ton trailer were assigned to the platoon.

(7) The Platoon Leader, Platoon Sergeant, Squad Leaders and loaders were armed with the carbine.

(8) The gunners were armed with the Launcher, Rocket, AT, M1.

(9) The chauffeurs were armed with the rifle.

(10) Each gunner had a pair of shoulder pads, M2 and an ammunition bag M1.

(11) Each loader had a pair of shoulder pads M2 and an ammunition bag M2.

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26. Test No. 20.

a. Purpose: To determine satisfactory methods of carrying the launcher and rockets.

b. Method: Various schemes were tried. One platoon made a 5 mile march, part of which was through heavy woods and thick underbrush. The gunner carried 3 rockets in an M1 bag. Part of the launchers were equipped with slings, part were not equipped with slings. The loader carried 8 rounds of ammunition in the Bag, Ammunition, M2. These loads were in addition to combat packs, belts, etc.

c. Results: See Plates 20, 21.

(1) The weight of the rockets caused the men to become very fatigued by the end of the 5 mile march. One loader dropped out.

(2) It was generally found most comfortable to carry the launcher over the right or left shoulder. For long distances a sling is desirable. The launcher when slung should be carried under the arm, barrel horizontal. If it is carried vertically, it is liable to strike the leg of the soldier while walking.

(3) In heavy woods only normal difficulties were encountered by the loaders.

(4) In the thick underbrush the bags would often catch in the underbrush.

(5) The launcher had to be removed from the shoulder and was carried in front of the body in heavy woods and thick underbrush.

(6) Each loader was able to creep 75-100 yards with no unusual difficulties.

(7) It was impractical and quite difficult for the loader to crawl while carrying eight rockets in the M2 bag. The loaded bag prevents the loader from getting down in the crawling position. The bag may be dragged by one end satisfactorily.

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(8) The gunner could creep or crawl by holding the launcher in either hand, parallel to the body and pushing it along the ground as the body was moved. The tube sometimes got considerable sand and dirt in it. In open terrain the launcher may be carried in the same manner as the rifle while crawling.

(9) The long containers in the M2 ammunition bag hit the loader's face unless he shifted the bag so it rode high in back and low in front.

(10) Weight carried by gunner, in addition to normal equipment:

Launcher	14.20
Shoulder pads M2	0.84
Ammunition bag M1	0.96
3 Rockets, M6 in containers	14.25
Total	30.25#

(11) Weight carried by loader, in addition to normal equipment and carbine, hanger and ammunition for carbine:

Shoulder pads M2	0.84
Ammunition bag M2	1.80
8 Rockets, M6, in containers	38.00
Total	40.64#

(12) The launchers, rockets, bags and pads for two squads could be loaded in one 1/4-ton truck and one 1/4-ton trailer. Equipment for 8 teams was put in the trailer, making a total load in the trailer of about 567 pounds. The load in the 1/4-ton truck was composed of launchers, bags, pads and rockets for 4 teams, giving a total load in the truck of about 284 pounds, allowing room and weight for one passenger in addition to the chauffeur.

27. Test No. 21.

a. Purpose: To determine methods of instruction and a course of instruction in order to train men properly in the use of the launcher and rocket.

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b. Method:

(1) A group of men was trained in the use of the rocket. During the training, many different positions, methods of loading, etc., were tried out. The group was divided into three platoons, each platoon composed of 1 officer, 1 staff sergeant, 4 sergeants and 52 privates.

(2) The platoon from the 151st Infantry was trained in preliminary work, and each man fired one shot at a stationary target.

(3) The platoon from the 29th Infantry was trained in preliminary work, and had more time spent on loading technique, tracking, etc., Each man fired 4 shots, one at a stationary target and three at moving targets.

(4) The platoon from the 124th Infantry had approximately the same amount of dry firing as the platoon from the 29th Infantry, but each man fired approximately 8 shots.

c. Results:

(1) A tentative draft for a manual on the launcher and rocket is enclosed herewith as Appendix "J".

(2) The positions and techniques found most desirable are included in Appendix "J".

(3) The standing, kneeling and sitting positions described in Appendix "J" are the most satisfactory for firing at moving targets.

(4) The prone position is not a good position for firing at moving targets, as it is difficult to track smoothly. Some men have considerable difficulty getting the head high enough for sighting at ranges of 300 and 400 yards.

28. Test No. 22.

a. Purpose: To determine a suitable type of foxhole from which to discharge the launcher.

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b. Method: Trial and study.

c. Results:

(1) Two individual foxholes, placed close together:

(a) The crew is separated.

(b) The loader can load the launcher only when the rear of the launcher is close to his foxhole. In many positions, the gunner will have to turn so that the loader can reach the launcher.

(c) When the launcher is fired with the breech pointing towards the loader's foxhole, the loader will get the full force of the blast.

(2) Narrow slit trench:

(a) In certain firing positions, the blast of the launcher will be directed into the trench.

(b) The loader can not reach the launcher for reloading except when the breech is directed generally towards him.

(c) When the gunner changes his direction of fire from one side of the trench to the other, the loader may interfere with the launcher tube unless he ducks.

(3) One large foxhole: (see sketch, following page).

(a) The team is together.

(b) The loader should remain on the right side of the gunner and should move around with the gunner, to avoid interfering with the gunner and in order to be able to serve the piece readily.

(c) The gunner should be trained to fire with his back against the wall of the foxhole, to insure that the breech blast is outside of the hole.

(d) It is desirable to remove all loose dirt from the vicinity of the foxhole to reduce the dust cloud

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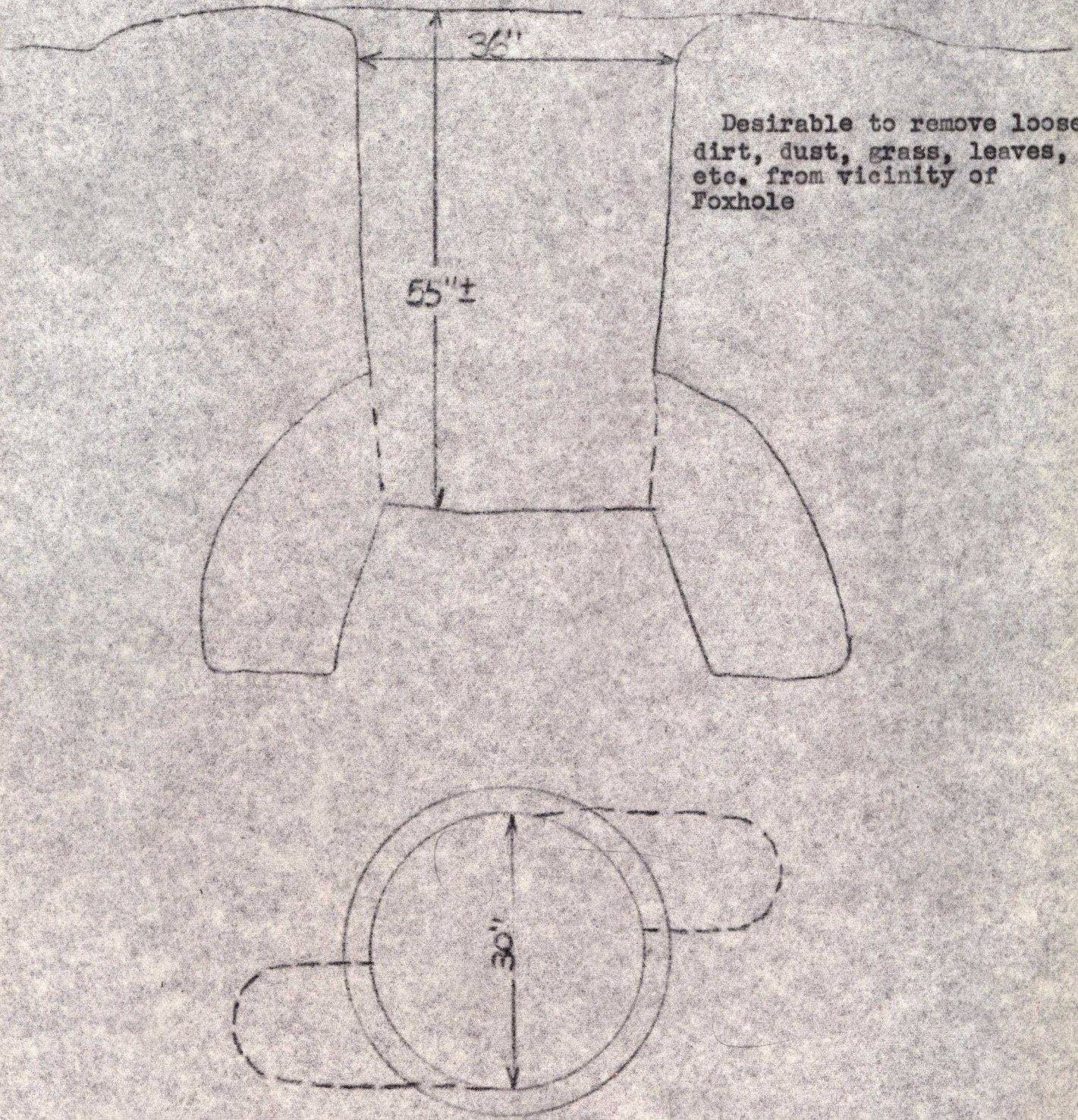

Sketch of Satisfactory Foxhole

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raised by the blast. Every effort should be made to hold down dust, grass, and twigs in the vicinity of the hole.

(e) Niches may be dug in the sides of the hole at convenient locations for storing ammunition.

29. Test No. 23.

a. Purpose: To determine the effect of the M6 rocket on sandbag walls.

b. Method: Sandbag walls about 4 feet high were built. One wall was made of Engineer sandbags, interlocked, so that the wall was two sandbags thick. Other walls were erected three sandbags thick. Rockets were fired at the walls.

c. Results:

In every case, a large gap was blown in the wall. Sandbags above the point of strike were blown to the rear or to the sides. Bags below and on the flanks of the grenade were torn and damaged. Personnel close behind the wall would have been injured. Complete penetration was accomplished.

30. Test No. 24.

a. Purpose: To determine danger to the gunner from the breech blast when firing from an enclosed place.

b. Method: A vertical wall was erected about 10' high and 12' wide. The launcher was fired with the breech at varying distances from the wall and the effect of the blast noted on the firing personnel. An observer stood on each side of the firer.

c. Results:

(1) The launcher was fired with the breech blast centered on the panels and with the breech at varying distances from the wall, ranging from 20' to 3'.

(2) Beginning when the breech was approximately 10' from the wall, a puff of warm air could be felt on the back, but it was barely noticeable.

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(3) A total of 10 shots was fired with the breech from 3 to 20 feet from the wall. In no case was the discharge particularly unpleasant. It is possible that it would be safe to fire with the breech closer to a wall than 3'. In an emergency, it is believed that breech could be as close as 18" to a wall, without injuring the firer.

(4) At the shorter distances, the boards were marked by bits of powder and fragments of the ignition wire were stuck in the panels.

(5) The firer's back was about 13" from the rear of the launcher, or about 4' from the wall.

31. Test No. 25.

a. Purpose: To summarize the various difficulties and defects encountered with the rocket.

b. Method: Study of all firing and examination of equipment.

c. Results:

(1) Practice Rocket M7.

These rockets were used to train personnel in the technique of loading the piece in preliminary marksmanship. The rockets were not fired during this training, but were used repeatedly in loading practice. In most cases the plug was not pulled out of the tail, this procedure being simulated. When an attempt was made to fire these, it was found that a high percentage of misfires was obtained. Apparently the handling had broken the contacts, shorted out the wiring or otherwise made the rocket defective. For training in loading, a drill rocket should be manufactured or improvised.

(2) AT Rocket M6.

(a) This rocket would not detonate satisfactorily on ground impact especially at the shorter ranges, where the angle of impact was very flat. Approximately 70 to

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80% failed to detonate on ground impact. Some intact grenades were found buried 18 to 20 inches in soft ground.

(b) A considerable number of grenades broke into two pieces on impact. The break occurred at the point where the rear of the head is formed down to tail diameter. In some cases the detonator would be fired after the head had broken off.

(c) A fair number of misfires was noted. In the early stages of the shooting, many of these misfires could be made to fire on a second attempt, indicating a poor contact on the first trial. With the technique of loading which was finally adopted for instruction, the number of misfires which would fire on the second attempt was very greatly reduced.

(d) The grenade was not sufficiently stable in flight, and some would oscillate over a very wide angle.

(e) A large number of hang-fires was noted, in which the discharge of the rocket was delayed a noticeable period.

(f) Some rockets were very difficult to get into some launchers, due to the rocket apparently being oversize.

(g) The insulating braid running from the nose contact to the tail was of two or three different types. A soft, flexible type sometimes gave difficulty, as it wrinkled when an attempt was made to insert the grenade in the launcher. The stiffer type of braid did not cause any trouble in this respect.

(h) Occasionally the plug in the tail would not come out when the string was pulled. During instruction firing, these plugs were dug out with a knife.

(i) Accuracy of the grenade was not good, considerable dispersion being obtained both laterally and vertically.

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32. Test No. 26.

a. Purpose: To determine the major weaknesses in design of the launcher, which show up in broken, bent or deformed parts after use.

b. Method: Launchers were inspected as they were removed from the packing cases and again inspected at the conclusion of the instruction of the three platoons.

c. Results:

(1) Before use by Test Section:

(a) One rear guard had broken loose from the tube and could be slid back and forth on the tube.

(b) Approximately 15-20% of the launchers showed signs of rust in the vicinity of some of the welding, indicating improper cleaning of the metal after welding and before painting.

(c) Most of the tubes were bent, with the concave side towards the stock and grips, indicating that welding these items to the tube caused the bending.

(2) After use by platoons: Total number of launchers inspected -- 94.

(a) Contact mechanism broken or bent, 32 guns.

(b) Rear sight broken, bent or otherwise defective, 7.

(c) Front sights and guard bent or broken, 19.

(d) Face pieces loose, 35.

(e) Rear guard badly bent, 4.

(f) Tail clamp broken, 2.

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VI DISCUSSION

33. Figures on the time of flight, as noted in Paragraph 8, are not entirely consistent and it is probable that one or more are incorrect. However, although the figures may be slightly incorrect, they are close enough to enable information to be obtained on leads necessary on moving targets.

34. The lead table, Paragraph 9, was calculated on the figures shown in Paragraph 8. Due to the long times of flight, it should be noted that the leads required are rather great. Inasmuch as it may be difficult to estimate the speed of a moving vehicle accurately, it is evident that the practical difficulties involved in hitting moving vehicles at long range are rather great. The men being trained in the use of the rocket probably made about 25-40% hits on a 10 m/h moving target at 300 yards, but the range was known and the speed of the vehicle was known. It is not believed that this percentage of hits could be made under combat or simulated combat conditions. The Test Section believes that the maximum practicable range of the rocket on moving targets is 300 yards.

35. It will be noted in Paragraph 10 that the accuracy of the rocket is not very good. Firing of approximately 1000 rounds in this test merely served to verify that opinion.

36. The trajectory of the rocket is necessarily quite curved, due to the low velocity and long time of flight of the projectile. This makes it difficult to hit a target at long range unless the range is estimated very closely.

37. The curved trajectory, plus the long leads necessary, plus the inaccuracy of the rocket would indicate that it was best fired at ranges of 200 yards and under. With the rocket, as the range decreases, the probability of a hit increases very rapidly.

38. The front sight studs were not located and graduated very accurately, and it was generally found necessary to hold several feet left. The 200 yard stud was not correctly placed vertically, as shown in Paragraph 11.

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39. When care is taken to properly align the sights, the accuracy of sighting is quite satisfactory, as shown in Paragraph 12.

40. The tail latch generally holds the rocket firmly and there isn't much possibility of a rocket falling out of the grasp of the latch, unless the launcher is vertical and is shaken quite violently. It is probable that the launcher can be carried with a rocket in it, ready to fire, providing reasonable precautions are taken.

41. Rockets fired through a dented barrel (Paragraph 15) merely straightened out the dents and it is not probable that any serious damage to gun or gunner could result from shooting a launcher with slight dents in it, when using practice ammunition. When using HE, results will depend on the type of fuze and the sensitivity of the fuze before the rocket leaves the launcher.

42. The launcher is apparently not materially affected by water, and it should function satisfactorily and be safe to shoot in the rain.

43. Rockets in sealed containers will apparently withstand long periods of rain with no ill effects, as the container is quite waterproof. Rockets can be left in the rain for some time with no ill effects, providing care is taken that water does not get around the waterproofing plug in the nozzle. This is apparently the weakest link in the waterproofing of the rocket. If the rocket is carried with the tail down, protected from the rain, it should function satisfactorily after considerable exposure. The container, with the tape removed, should provide a high degree of protection from rain. Where there is a possibility of use of the rocket, it would seem desirable to remove the waterproofing tape from the container. It is believed that the rocket, in the unsealed container, should be able to withstand considerable periods of rain. Removing the tape consumes considerable time, and necessitates movement on the part of the loader, neither of which are desirable during a mechanized attack.

44. Instructions contained in OFSTB 200-6 stated that the waterproofing plug in the nozzle of the rocket must be removed

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before firing. Paragraph 18 shows that this is not necessary. It may be desirable to remove the plug, but in an emergency the rocket can be fired with the plug in the nozzle. Occasionally the string fastened to the plug will pull through the plug without removing it.

45. From Paragraph 19, it will be noted that the performance of the M6 rocket is generally similar to that of the M9A1 grenade. The hole made by the M6 is somewhat larger than that made by the M9A1. Maximum penetrations of the M6 or M9A1 are not known.

46. It has been reported (Tactical & Technical Trends, #4) that a special Mk III German tank in Libya has the following frontal armor: Outside plate 20mm (0.79"), inside plate 50mm (2.36"), the two plates being separated by a 200-250 mm (7.9-9.8") air gap. From the results of Test No. 14, Paragraph 20, it is evident that the German armor described might resist penetration by the M6 rocket.

47. From Paragraph 21, it is evident that an individual would probably be safe in firing the M6 rocket at a tank within 5 yards and definitely safe at 10 yards, in so far as fragmentation is concerned. The danger radius of the blast effect is not known, but is probably not great. The effective radius of fragmentation to the flanks is approximately 10 yards.

48. The electric type rocket, as noted in Paragraph 22, may be fired as a mine or booby trap to a range of 200 yards (approximate), either electrically or mechanically. The rocket can not be used as a stationary mine, due to the inertia type of fuze used. The maximum velocity of the rocket is obtained after approximately three feet travel, so that the fuze may be expected to function satisfactorily if the rocket is placed more than three feet from the target.

49. Because of the blast of gas to the rear of the launcher and because of the relatively high angle at which the launcher is normally fired, a considerable disturbance is created in rear of the launcher. Dust, leaves, twigs, etc., are blown about. It is desirable to select a firing position which will minimize the effects of the blast, as the cloud of dust is quite noticeable from the front or flanks. The flame from the breech is noticeable from the flank particularly at dusk or in the dark.

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50. Various types of foxholes were tried, but the type shown in Paragraph 28 appeared to be the most satisfactory. Since the launcher is best operated by a 2-man team, it was thought desirable to put both men in the same foxhole. Two individual foxholes, close together, were tried, but did not prove satisfactory. In shooting from a foxhole, trench, etc., care must be taken that the breech of the launcher is above the vertical wall, to prevent the blast from being deflected against personnel by the rear wall. Because of the blast from the rear of the launcher and because the breech is close to the ground, loose dust and dirt should be cleared away from around the foxhole to reduce the likelihood of the discharge of the launcher being noticed.

51. From Paragraph 31 it can be seen that the present M7 rockets are not 100% satisfactory. For training personnel in service of the piece, a drill rocket should be manufactured or improvised from fired and recovered M7 rockets.

52. The fuze of the M6 rocket was not sufficiently sensitive to consistently produce detonation on ground impact. The majority of grenades would fail to go off on ground impact. While the fuze should not be so sensitive that there is danger to the gunner or loader in normal handling of the rocket, it should be sufficiently sensitive to produce ground detonation. It is understood that a new type of fuze is being designed for the rocket grenade.

53. Too great a number of misfires was encountered during this test. During the early stages of the tests, some misfires would fire on the second attempt, indicating a poor contact on the first try, but after adoption of the method of loading described in Appendix J, very few which failed on the first attempt would fire on subsequent tries. The cause of the misfires was not determined. However, in many cases the igniting element could be heard to function in the tail of the rocket. Apparently the black powder primer failed to ignite in some cases.

54. In a good many cases hang-fires were noticed which gave a material delay in ignition after pressing the trigger. These might be dangerous, if the gunner let the muzzle drop after pressing the trigger and before the propellant ignited properly. Furthermore, unless men are carefully trained to swing with the vehicle and to "follow through", hang-fires may cause misses.

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55. The grenade is not sufficiently stable, as it would yaw in flight, sometimes to an extreme degree. Perhaps caused by this instability or by other reasons, the accuracy of the grenade is not good. Inaccuracy of the grenade, combined with the curved trajectory and the incorrect sight settings, makes it difficult to hit small targets at any great range. The limited accuracy tests in Paragraph 10 illustrate the inaccuracy of the rocket, and the consequent difficulty of hitting small targets.

56. The batteries used in the launcher are not standard in the infantry, according to information available to the Test Section. Consequently, extra batteries would have to be purchased, stored and issued separately from all other batteries. The stock should be redesigned so that it will take two flashlight cells of standard type. It is believed that the batteries should be inserted from the rear of the stock, rather than from the bottom as at present. Although no case was encountered during training, there is a possibility of the cover becoming loosened and the batteries falling out the bottom of the stock.

57. The launcher may be loaded and fired by one man, but it is a slow process and not very satisfactory. The gunner has to take the launcher off his shoulder and move it so that he can insert a rocket. Then he has to put it back on his shoulder. With a two-man crew, the rate of fire is greatly increased and the movement necessary on the part of the crew is considerably less. The crew for operating the launcher should normally consist of at least two men. This crew can carry considerable ammunition and can deliver a fairly high rate of fire (about 10 rounds per minute). If it is necessary to have more ammunition with the gun than can be carried by a two-man crew, then it will be necessary to add one or more ammunition carriers to the crew. The two-man crew can carry 11 rounds of ammunition for moderate distances on foot.

58. The Test Section does not believe that the launcher M1 for firing M9 and M9A1 grenades from the rifle should be replaced by the rocket launcher throughout the Infantry regiment. As organized at present, the infantry squad has one man who is prepared to shoot M9A1 grenades. Until he prepares to fire these grenades, he can function as a normal rifleman, and will assume antitank duties only for relatively

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short periods. The rocket launcher can not be used in the same way, since the man who carries it can not normally function as a rifleman. The M9A1 is a very effective grenade, considering the relatively slight additional amount of equipment involved. The grenadier firing the M9A1 is not much more conspicuous than a rifleman.

59. In Paragraph 30 it will be noted that the launcher was fired with the breech 3' from a wall, without injury or discomfort to the firer and observers alongside the firer. It is evident that the launcher can be fired from moderate sized rooms without discomfort to the firer and it is probable that it can be fired from a room 10' by 10' or smaller without material discomfort providing the room has an opening (door or window). It is not believed that the subject weapon can be safely fired from small pill boxes or other confined places.

60. No accessories were found necessary for operating the launcher. Some method of carrying ammunition is necessary, however. Ammunition bags M1 and M2, with shoulder pads M2, proved satisfactory for carrying the equipment, except that the long tubes in the M2 bag interfered with the loader's face, unless the bag was shifted so as to ride high in back and low in front. It is understood that the rocket is to be shortened. If so the M-2 bag will be ideal. The carbine sling has been used satisfactorily. The most satisfactory method of carrying the launcher with a sling was with the barrel horizontal. The sling may be over the right shoulder, with the launcher carried on the right side under the arm, or the sling may be over the left shoulder with the launcher on the right side, stock and handgrips down. The launcher may be carried on the right or the left side. The sling should be of wide webbing and adjustable in length. The center of gravity of the launcher should be about in the center of the sling. Suspension points of the sling should be about 2' apart. The sling should be about 45" long.

61. There should be at least two types of rockets: (1) A dummy for training personnel in service of the piece, and (2) an HE antitank grenade. It is understood that a third type is being developed for anti-personnel use. This will considerably increase the usefulness of the launcher. Although training should be accomplished with H. E. rockets

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a practice rocket would be acceptable if it can be made considerably cheaper than the HE type. The practice rocket can not be satisfactorily reloaded and fired again, since the grenade is usually considerably deformed after firing.

62. Appendix J sets up a training program calling for 10 shots per man. It is believed that this number of rounds will permit enough firing to make a man fairly adept in the use of the launcher and rocket. It is believed that personnel normally expected to bear the brunt of a mechanized attack should be thoroughly trained and should be permitted to fire from 10 to 15 rounds in practice. Other personnel, such as chauffeurs, should receive the same basic training, but firing of 5-10 rounds should be sufficient, although more would be desirable.

63. In training personnel with this weapon, it has been found that moving targets can be satisfactorily tracked when moving either towards the right or towards the left, as long as both eyes are kept open. Little difficulty was encountered in teaching men to fire at vehicles moving in either direction. If the left eye is kept closed when tracking moving targets traveling from right to left, the barrel blocks out the target when lead is taken, but with both eyes open this difficulty is largely overcome.

64. Reference b says (Paragraph 4 g) in part "***the nature of the launcher and the weight of ammunition together with the fact that this is a weapon of opportunity used on relatively rare occasions and useless for all purposes except one ***." The Test Section does not entirely agree with this statement. The primary purpose of the launcher and rocket is to combat tanks. Due to the nature of the M6 rocket, the Test Section believes that it would be a valuable addition to an infantry unit when attacking any fortified portion or semi-fortified obstacle (See Paragraph 29). The great penetration of the M6 projectile, combined with the mobility of the weapon and crew and the low silhouette, makes it a superior weapon for knocking out sandbagged emplacements, attacking buildings and houses in village fighting and for general use on any other moderately fortified position. The 75mm and 105mm assault guns and the 37mm AT gun will also be effective on these installations, but they are much more conspicuous.

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65. If a fragmentation projectile is developed for discharge from the launcher, it is believed that the possible use of the launcher will be greatly enlarged. While projectiles from other weapons may be more effective in themselves, the mobility, low silhouette and relatively flat trajectory will make this a most useful weapon for uses other than antitank.

66. The bulb on the left side of the stock may indicate if the battery and trigger switch are working satisfactorily. However, since it is in parallel and not in series with the firing circuit, it does not necessarily indicate that the firing circuit is unbroken. If the bulb fails to light, the circuit may be broken, the battery may be dead or the bulb may be burned out. A great many guns gave satisfactory results when the bulb would not light.

67. The spare bulb is now carried under a plate on the right side of the stock. It is believed that the spare bulb should be carried where it is more readily accessible. The hole in the bottom rear of the stock, cut out for the latch on the floor plate, would make a satisfactory place to carry the spare bulb if it were deepened slightly. To prevent the bulb falling out every time the floor plate is opened, a small wad of paper could be stuffed in behind the bulb to hold it in place.

68. After firing 3-4 rounds in a few minutes, the launcher becomes quite hot, particularly at the back end. It is then impossible for a man to keep his fingers on the rear of the launcher without getting burned. The launcher also becomes hot and will burn the gunner at the point where it rests on his shoulder, unless he is wearing heavy clothing or the M-2 shoulder pad. It is desirable to put some insulating material on two places to prevent burning the crew and to insure rapid operation:

a. The top of the tail latch for its full length,

b. A patch about 3 inches square on the underside of the barrel below the location of the tail latch.

69. The face guard is designed to prevent the gunner from burning his face by laying it on the hot barrel. In some positions, particularly when firing at the longer ranges, the man's face does not normally contact the barrel, due to the

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location of the sights. If the launcher is left in the sun, the face guard frequently becomes so hot that it is impossible for the gunner to lay his cheek against it. Since it does not entirely serve the purpose for which it was designed, the Test Section believes that the face guard should be eliminated, thereby reducing the weight of the launcher about 1/2 pound. In its place a patch of insulating material should be fastened to the barrel.

70. The defects discovered in the equipment and suggested changes are summarized below:

a. Rocket and launcher:

(1) Accuracy is poor: Accuracy should be greatly improved if the weapon is to be used on small targets at ranges over 200 yards.

b. Rocket M6:

(1) Fuze is too insensitive: Sensitivity of the fuze should be increased to insure detonation on ground impact, with sufficient safety to the crew.

(2) Braid on some rockets is too soft and flexible, making insertion of the rocket difficult: Braid should be made thinner, stiffer, or both.

(3) Rocket not sufficiently stable in flight: The balance of the rocket should be changed, or more fin area added to stabilize the rocket and reduce oscillation.

(4) Some rockets are apparently oversize, causing difficulty in insertion of the rocket in the launcher: This might be due to a battered gun, but it is believed that in many cases the diameter of the rocket over the braid was too great.

(5) String pulled out of tail plug: No change necessary if firing the rocket with the plug in the tail does not affect the safety or flight of the rocket.

(6) Trajectory very curved, requiring exact estimation of ranges: Time of flight should be reduced to the

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very minimum by increase in muzzle velocity and possibly by improvement of ballistic coefficient.

(7) Long time of flight: See (6) above. Reducing the time of flight will increase probability of hits on moving vehicles, as well as on stationary targets.

(8) Misfires: A study should be made of the ignition element and the black powder primer and the propellant to reduce the number of misfires.

(9) Hang-fires: A study should be made of the ignition element, the black powder primer and the propellant to reduce the number of hang-fires.

(10) Length of the rocket: In the M1 or M2 ammunition bags, the rocket makes an awkward load because of its length. If possible, the length should be reduced, providing that the ballistic properties of the rocket are not harmed.

c. Rocket M7:

(1) The remarks in b. above apply, except b. (1).

(2) The rocket is not sufficiently sturdy to permit constant use in service of the piece: A drill projectile should be manufactured.

d. Launcher M1:

(1) Contactor mechanism: Should be redesigned or strengthened to prevent bending and to insure returning to "safe" after firing.

(2) Sights: Sights should be correctly adjusted so as to center the point of impact on the point of sighting at the four ranges. Sight not required or desired on right side.

(3) Insulation: The top of the tail latch, the bottom of the barrel below the rail latch should be covered with insulation to prevent burning the hand of the loader.

(4) Batteries: Standard flash-light batteries BA-30 should be substituted for the present non-standard batteries.

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(5) Front hand grip: The front hand grip should be moved back approximately two inches.

(6) Weight: It would be desirable to reduce the weight of the launcher as much as possible, consistent with sturdiness. A few parts, such as the front sight guard, rear guard and contactor mechanism, are not sufficiently sturdy at present.

(7) Sling: A sling would be desirable to help in carrying the launcher. The carbine sling will do.

71. In considering the many possible uses for the launcher and rocket, it is well, at the same time, to consider their limitations. The following points should be kept in mind:

Inaccuracy: difficult to hit small targets.
Long time of flight: requires long leads when firing at moving vehicles. Possibility that the vehicle may change direction while the rocket is in flight.
Curved trajectory: the curvature of the trajectory demands rather exact estimation of ranges in order to make hits.
Breech blast: postion will be given away by dust, unless care is taken to avoid this feature.

VII CONCLUSIONS

72. The Test Section concludes that:

a. The rocket launcher is effective, to a range of 300 yards, against tanks, emplacements, materiel and personnel.

b. The rocket launcher is an excellent offensive weapon for Infantry use and should be used in large numbers.

c. The rocket launcher may be used by one man but should be served by a crew of two men to produce a rate of fire of 8-10 rounds per minute.

d. There are no Infantry weapons which should be abandoned at this time to make room for the subject launcher.

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g. There is no available space in appropriate Infantry transportation, for the subject weapon and ammunition, due to the fact that they are overloaded.

f. Pending readjustment of personnel and transportation within the Infantry regiment the only solution is to superimpose the weapon and ammunition.

g. The rocket should be improved as indicated in paragraph 70 above.

h. The launcher should be improved as indicated in paragraph 70 above.

i. Accessories may be limited to the following items per launcher;

1 Sling (Carbine),
1 Bag, ammunition M-1 per Rocketeer,
1 Bag, ammunition M-2 per Loader,
2 Pads, Shoulder, M-2 per Launcher if and when the launcher becomes a principal weapon.

j. The course of instruction indicated in Appendix "J" is satisfactory.

k. The ammunition requirements for training in the proposed course should be:

10 rockets (preferably H.E.) per man,
2 dummy rockets (no propellant) per launcher.

l. The subject rocket may be fired from open emplacements or partially enclosed spaces such as rooms with an open door or window but not from an enclosed space such as a pill box.

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